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MANUFACTURING PRODUCT FLOW PATH OPTIMIZATION FOR COMPANY D

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ABSTRACT

Supply chain process mapping is one of the most critical and widely used tools in supply chain management in regards to process improvement. As supply chains become increasingly global and complex, the need to accurately capture the state of current business processes is imperative not only for organizational and strategic alignment/re-alignment, but to also find otherwise hidden inefficiencies in a firm's supply chain. A variety of widely used mathematical and qualitative approaches for supply chain process mapping are used by firms in order to find optimizations in their supply chain processes. This thesis will utilize the concept of supply chain process mapping in order to analyze opportunities within Company D's supplier relationships, new product processes, order fulfillment processes, and customer relationships.

The thesis includes a composite of executive insights, site tours, secondary research, and application of traditional operations management strategies. Multiple strategic supply chain leverage points were identified for further analysis in respect to Company D's manufacturing strategies.

The research in this thesis identified multiple opportunities for Company D to segment their supply chain strategy in regards to demand profiles, purchasing strategies, and customer profiles as well as strategies to increase their supply chain visibility.

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Chapter 1

Introduction

Supply Chain Network Design Overview

Supply chain networks, especially in the past few decades, have become incredibly complex. Many firms now have to source, deliver, and manufacture internationally, adjust to the always changing demand in customer service requirements, mitigate supply chain disruptions or risk, and increase the visibility of their always extending supply chains. All of these elements must be accounted for in conjunction with cost containment to continue to ensure profitability for firms.

Given the rapid changes in technology, information, and customer demands, it is rare to find a supply chain network design that is completely up to date and perfectly complements the ever-changing business environment. However, supply chain networks that have not been evaluated in recent years are likely to contain concealed network cost improvement opportunities as well as probable process improvements (Coyle, Novack, Langley, & Gibson, 2013). In fact, careful consideration and design/re-design of supply chain networks can enable firms to discover new competitive advantages within their industries.

The first step in researching the design, or re-design, of a supply chain network is to map the process or movement that the current supply chain follows (Coyle, Novack, Langley, & Gibson, 2013). While there are different methodologies and tools on process mapping within supply chain management, at the core they follow a very similar exercise: identify products to

map, identify distribution channels, map physical locations, identify information flow, and identify process alternatives (Supply Chain Opz, n.d.). The identified alternatives could impact a multitude of segments within the supply chain network such as parcel carriers, transportation modes or methods, a reduction in supply chain movement, or changes in sourcing locations. In short, a careful approach to supply chain process mapping enables firms to realize other ambiguous opportunities within their operations.

Company Information

Company D is a privately held, luxury jewelry retailer based within the United States. Currently, they produce approximately 27,000 styles of their jewelry. Their product portfolio consists of many complex and unconventional gems, metals, and materials that contribute to the uniqueness of their products but also leads to obstructions within the management of their supply chain network. As a result, Company D now sources, manufactures, assembles, and delivers both domestically and internationally (international locations are primarily located in Asia). They are currently contracted with over 300 component vendors and 70 production/assembly vendors, many of which they haven't conducted business with in years. Company D has never mapped their manufacturing product flow-path and would like to understand ways that they can improve the movement of their manufactured goods, in hopes of generating lower supply chain network costs as well as increasing the visibility and efficiency within their supply chain network.

Scope and Focus

The objective of this research is to map the current manufacturing product flow-path of Company D and to design alternative product flow-paths for the nominated SKUs (stock keeping units). The nominated SKUs will first be selected by performing a Pareto analysis on pure volume of the SKUs sold. Then, they will be pared down through the utilization of a matrix-methodology that will reference various characteristics of the SKU's, more specifically their demand profiles. The scope of the manufacturing product flow-path mapping and redesign analysis will be performed on a representative SKU for each characteristic combination.

The concept of having a representative SKU matrix is to provide Company D with a reference to also re-design the manufacturing product flow-path of their 27,000 SKU product portfolio. The analysis may then result in recommendations of improvements of information flow and cash flow.

Chapter 2

Background

Company Overview

Company D is a privately owned high end jewelry manufacturer headquartered in New York, New York and was founded in 1980. Company D manufactures a variety of jewelry as well as watches, eyewear, and in more recent years, fragrances. Company D currently manages their own chain of high-end boutiques primarily in large domestic metropolitan areas such as New York City, Las Vegas, and Houston. In recent years, Company D has been implementing strategies to expand their business globally in areas like Asia (Hoovers, n.d.).

Distribution Channels

Company D has a presence in their own boutique stores, high-end retailers such as Neiman Marcus and Saks Fifth Avenue, as well as wholesale and ecommerce (Hoovers, n.d.). Domestically, Company D owns approximately thirty-one boutiques, as well as one in Canada, one in China, and one in France (Hoovers, n.d.).

Company D used to only distribute their product through their company owned boutiques and wholesale. About ten years ago, Company D decided to enter the retail space, which now makes up twenty percent to forty percent of Company D's sales volume.

It wasn't until about three years ago that Company D entered the e-commerce space as well. Since then, Company D has experienced approximately a thirty percent increase of units sold per year. E-commerce initially used to be managed by the high-end retailers that Company

D distributes to, but in 2014 they decided to take the operation in-house. In terms of product allocation and prioritization, retailers and wholesalers get access to available inventory first, and then e-commerce.

Company D's current e-commerce operations have not yet reached the global scale. Orders can only be placed for delivery in the contiguous United States, Puerto Rico, and Canada.

Product Lines and Life-Cycles

Company D Currently produces approximately 27,000 styles of jewelry, a significant decrease from their 57,000 previously offered styles. Their products, in terms of their life cycles, can be broken into three different subgroups: new, core, and foundation.

New products and/or styles account for approximately thirty percent to thirty-five percent of Company D's sales revenue. These are styles that are introduced during their seasonal promotions (traditionally twice a year in six month intervals, coined the "September" and "March" markets). These styles follow a make-to-order production methodology and are typically ordered by high-end retailers at jewelry tradeshows. Consequently, this results in somewhat unpredictable consumer demand and production capacity constraints.

Core products are products that sell at high volume and with fairly consistent demand patterns. As a result, core products are make-to-forecast. With 700 styles, the core products account for only 2.59 percent of Company D's product portfolio, but make up approximately fifty percent to fifty-five percent of Company D's sales revenue.

The last of the product lines are the *foundation* styles. These are styles that were once introduced as new but sell in low volumes. These account for approximately twenty percent to

twenty-five percent of company D's revenue, but has the largest amount of style offerings. Any of the 27,000 styles that were previously offered by Company D, but are not currently in their inventory, will be make-to-order. However, it is important to note, that the majority of the inventory held by Company D consists of the aforementioned foundation styles.

Business Cycles

Company D has two different "Markets" that they operate in, or seasons, designated as the "March" market and the "September" market. In September and March, Company D will participate in jewelry trade shows to promote their new products. High end retailers and wholesalers have the ability to place orders for these products at these events, and are promised to be manufactured and delivered by the commencement of the next trade season.

New products that have been introduced that have high-volume sales may be considered *builds*, or to become core products available for the next market. Approximately forty percent of company D's business activity occurs between Thanksgiving and the conclusion of the fourth quarter/end of year.

Suppliers and Manufacturers

Until 2007, Company D used to manufacture their goods locally. The CEO, depending on the designs and styles he aspired to produce, would source the required components as needed from any vendor that had the component in inventory. Now, company D manufactures about half of their products internationally in countries such as Thailand, China, Costa Rica, and India.

Manufacturing in these countries yields a lower variable cost structure and is located near markets which are commonly sourced from for gems and other jewelry components. Recently, a lot of manufacturing has been moved to Thailand specifically, and Company D now operates an office there.

Company D currently manages a very large supplier base and contract manufacturers. In order to support the production of their 27,000 styles, they rely on 300 component vendors located all over the globe as well as 40 contract manufacturers. Many of the 300 component vendors supply similar components, as well as the contract manufacturers offering similar capabilities. Upper management and executive insight suggests that there are possibilities to pare down the current supplier base.

Goods Assembly

Company D follows three different assembly processes for their product portfolio termed as: *Purchased/Buy Finished Goods*, *Manufactured*, or *Hybrid*. These processes can be characterized as follows:

Buy or *Finished Goods* are products that arrive at Company D's warehouse fully assembled and readily available for sale. Company D utilizes a "directed supply" system that their contracted manufacturers can use to decide which approved vendors they can source from in order to meet their production requirements. As such, Company D does not directly overlook the purchasing practices for these goods, but they do establish the manufacturing requirements for these production vendors. Products that are manufactured in the United States typically utilize lists of directed supply located domestically, and products that are manufactured

internationally tend to use components suppliers that are also sourced internationally. Company D estimates that eighty percent of their products follow this assembly process.

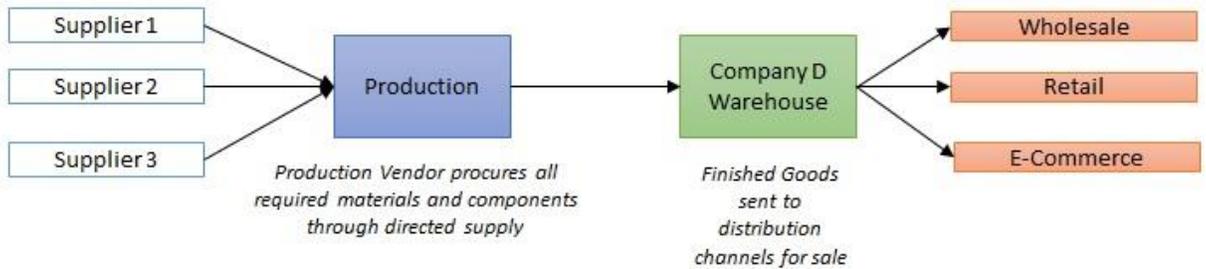


Figure 1 - Diagram of buy/finished goods assembly process

The second type of goods assembly procedure that Company D deploys is the *manufactured* goods assembly. Goods that are classified as manufactured are products that have their components on hand in Company D's warehouse where manufacturing kits are assembled

and sent to production vendors. The production vendors then send their completely assembled products back to Company D's warehouse for sale.

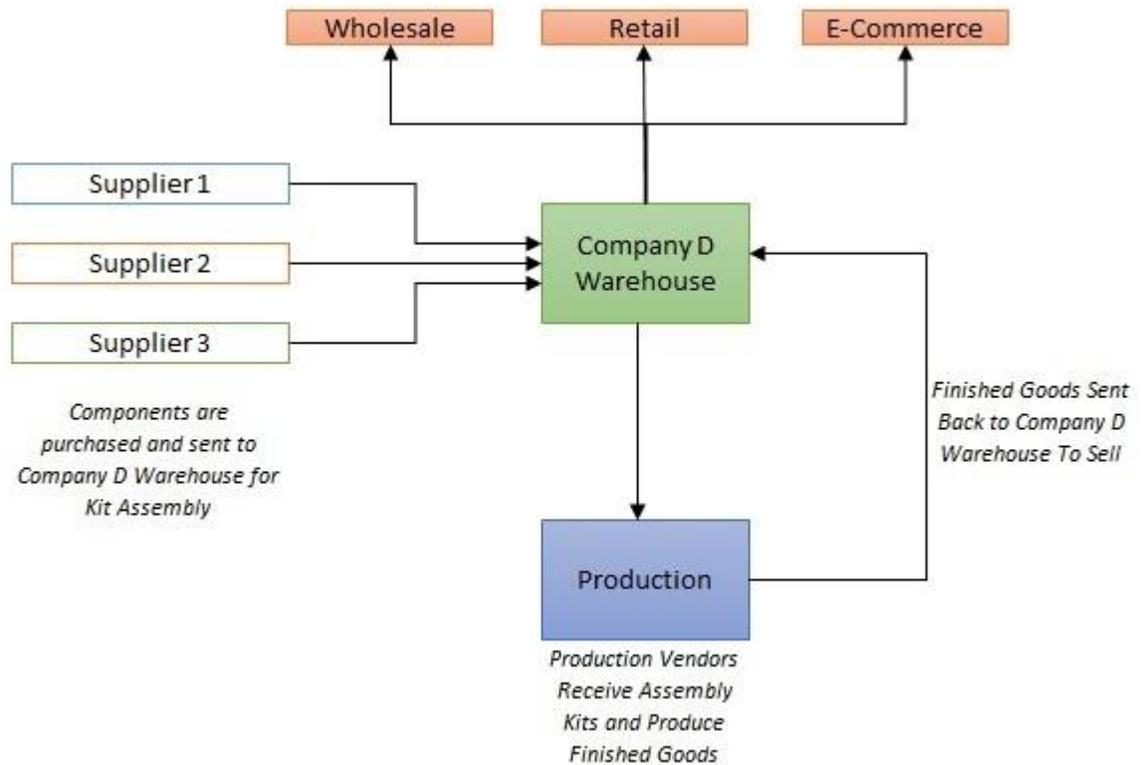


Figure 2 - Diagram of Manufactured Goods Assembly Process

The last of the goods assembly is called *Hybrid* assembly. Hybrid assembly is required for goods that contain a unique component, such as Blue Topaz. Company D's jewelry with Blue Topaz requires to be "cured" or must sit to change colors in their warehouse for three years and requires close surveillance so the gem meets product design specifications. Company D will hold this product until ready, send to a contracted manufacturer, and then transport the product back to Company D's warehouse.

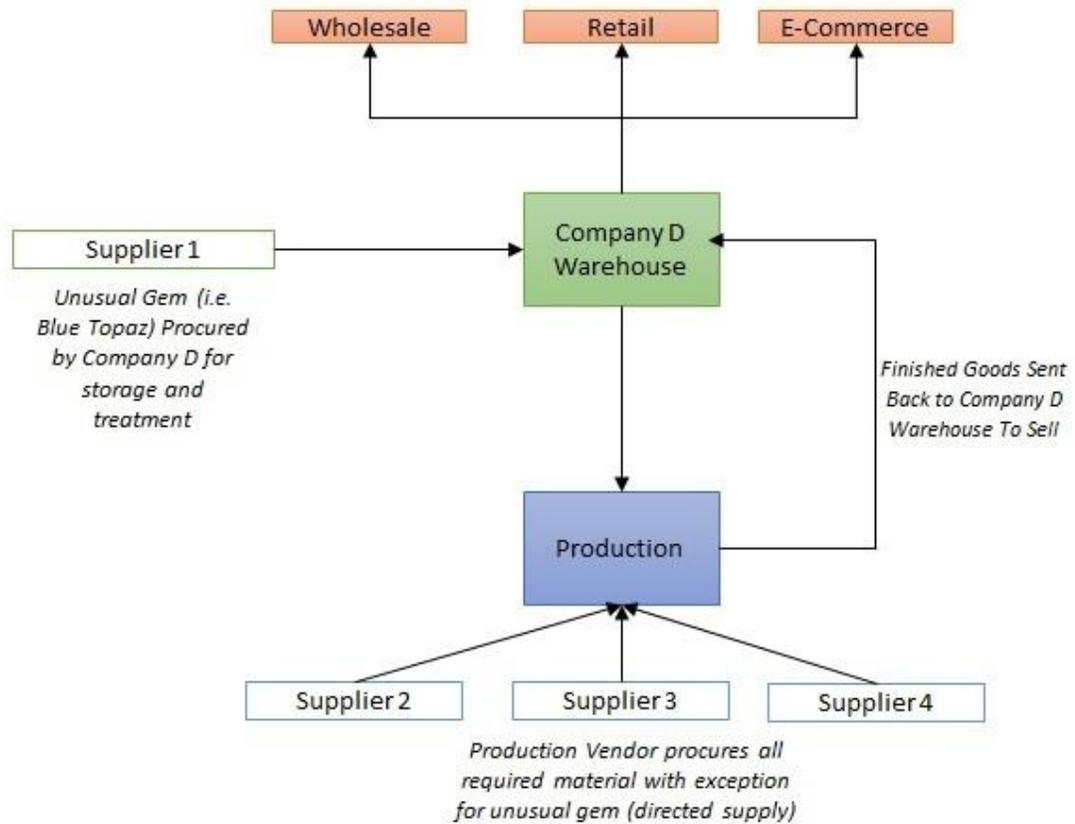


Figure 3 - Diagram of Hybrid goods assembly process

Seeing as a majority of these products sourced require components externally, this leads to a significant decrease in inventory that Company D has on hand, but also contributes to a loss of visibility and control of how manufacturers deliver and order products.

Vertical Integration

Many luxury brands, including the high end jewelry industry, have been taking the approach of vertical integration either within their supply base, their manufacturing base, highly specialized labor, or all three (Reddy, 2009). A luxury jewelry company in India named “Gem Palace” has been training workers in house on how to replicate antiquated stone setting processes

in order to further differentiate their brand (Reddy, 2009). Not only this, but their entire manufacturing process has been integrated vertically – including their sourcing, cutting, designing, and retailing of their own designs (Reddy, 2009). Since Gem Palace has complete control and transparency to these processes, they have the flexibility to produce a large variety of unique products.

To delve deeper into the concept of vertical integration in the jewelry supply chain, many luxury jewelry companies have been tying up their strategic supply sources in an effort to ensure “market dominance” in their chosen niche (Reddy, 2009).

Simon Brooke from CIPS.org cites that this move towards vertical integration may not be so much about cost conservation as much as it may be about securing supply. Luxury companies have been strategically analyzing where their suppliers are most threatened and securing them once identified. Given the projected growth of the luxury sector at four percent to six percent per annum, luxury companies that are vertically integrating their supply bases could potentially be absorbing long term competitive advantages (Brooke, 2014).

Brooke also states that these vertically integrated luxury companies can promote artistry, craft, enhance traceability of raw materials (becoming increasingly critical in supply chains that contain precious gems or potentially conflict minerals), and the quality of these raw materials.

Fast Fashion in Comparison To Fast Jewelry

In 2013, McKinsey consultants published a white paper on their predictions of the jewelry industry in the year 2020. McKinsey consultants drew an interesting parallel between apparel and jewelry, considering them “adjacent sectors” (Dauriz, Remy, & Tothermann, 2013).

Citing the similarities in these sectors often unpredictable demand patterns and their innovative nature, jewelry companies may move towards manufacturing and fulfillment models much like the supply chains we see in fast fashion powerhouses such as ZARA (Dauriz, Remy, & Tothermann, 2013). McKinsey consultants also alluded to a plateau in the activity of the online channels, as luxury brands cater to a unique retail shopping experience, and online purchasing is predicted to primarily be used for consumers to purchase more standardized and “understood” components (Dauriz, Remy, & Tothermann, 2013).

Fast-Fashion supply chains are excellent models because of their ability to move from concept to store with very quick lead times. In order for the jewelry companies to move from concept to retailer quickly, increased collaboration between suppliers, designers, and logistics providers will be essential in mimicking these fast fashion supply chains (Dauriz, Remy, & Tothermann, 2013).

Competition

Company D faces a significant amount of competition in the luxury jewelry sector. Companies such as Blue Nile, Inc., Gucci, and most notably Tiffany & Co. are mentioned as company D’s three largest competitors (Hoovers, n.d.). Tiffany & Co. dominates the market share with sales revenue of \$4.25 Billion in 2015 alone and approximately sixty percent gross profit margin (Hoovers, n.d.). Tiffany & Co. has been making strides towards vertically integrating their strategic suppliers into their supply chain (Brooke, 2014). This strategy has been implemented in hopes of further establishing their position in the jewelry sector.

Industry Information

Seeing as Company D participates in both retailing and manufacturing in the luxury jewelry sector, the performance and demand of these industries relies heavily on the health of the economy along with the prices of gold, silver, and other gems (Hoovers, n.d.). In terms of jewelry retailing, there is a very large focus on promotional and marketing activity, starting a trend of “f-commerce” or “Facebook Commerce” as well as other uses of social media (Hoovers, n.d.).

One notable trend that has been identified in the jewelry retail sector is the decline in retail jewelry stores (Hoovers, n.d.). Hoovers states that there was a decline of 1000 jewelry retail stores from 2003 to 2007. The theory behind this is the trend of many jewelry companies being merged or acquired, and as a consequence the store offerings are being consolidated.

Another industry trend that could have far-reaching implications for supply chain specifically is 3D printing or additive manufacturing. Jewelry companies have been adopting this method as a means to provide higher customization to their customers and a much shorter lead-time (Hoovers, n.d.). 3D printing is targeted to provide jewelry retailers significant decreases in manufacturing costs. In conjunction with 3D printing, jewelry companies are also using CAM or Computer-Automated Manufacturing to fine tune designs and to create easily replicable product molds (Hoovers, n.d.).

Chapter 3

Research Methodology

This thesis aims to illuminate the significance of supply chain process mapping in a manufacturing environment. This thesis was motivated by two questions: (1) Company D wants to have a comprehensive understanding of where all of their manufacturing components are coming from and (2) are there more linear processes that Company D can employ within their manufacturing processes in order to refine their operations strategy.

This thesis will employ a variety of research methods. Primary research will be done through measures of executive and employee interviews, as well as facility visits. Triangulating and ultimately integrating the findings from these interviews will serve as the basis of the “as-is” analysis for Company D’s fulfillment processes.

Utilization of secondary research will be done as well through thorough investigation of prior academic literature on the subject as well as exchanges within academia. Finally, a quasi-experimental approach will be used on a “Representative SKU Matrix” in order to further examine the sub-processes that Company D is deploying and to ultimately create new sub-processes for Company D to implement.

Representative Stock Keeping Unit Matrix

A Pareto analysis of raw sales volume from July of 2015 to January of 2016 will be initially conducted to further filter stock keeping units of which may be examined. Next, the two

stock keeping units with the largest sales volume for each of the following categories will be selected:

Purchased: Stock keeping units in which a contract manufacturer oversees the entire purchasing and manufacturing process of finished product.

Manufactured: Stock keeping units in which Company D purchases, stores, assembles kits, and sends to contract manufacturers.

Hybrid: Stock keeping units in which follow the “purchased” structure with the exception of a unique component that must be sent to a contract manufacturer by Company D

Consultation with supply chain employees at Company D will be conducted in order to ensure the selected stock keeping units selected for the analysis are truly representative. If not, Company D will provide information on alternative stock keeping units for process evaluation.

Chapter 4

Analysis

New Product Manufacturing Lead-Times

Company D markets, manufactures and then sells stock keeping units all with different demand characteristics and assembly strategies. *New* products account for approximately thirty to thirty-five percent of Company D's annual sale revenue and are primarily sold to their retail business as make to order.

However, during executive interviews, it was revealed that retailers are often purchasing approximately seventy percent of new products before Company D has verified whether their contract manufacturers have adequate capacity. Furthermore, the contract manufacturers under the direct supply agreements are responsible for the timely purchase of all required components. Once the high-end retailers place the orders, Company D enters an eighteen-week production and development phase. However, often times, the designs of these products change shortly after they are presented to the high-end retailers, and the eighteen-week production and development phase is shortened for Company D.

Company D also revealed that more often than not, their made to order deliveries do not meet the promised delivery dates for the high-end retailers. Company D has also been making significant efforts to shift their manufacturing activity to Asian countries, causing increases in lead-time and less visibility over the purchasing activities for their components. Company D also stated that if the required components for manufacturing are not secured well in advance of the trade shows, then Company D significantly increases the risk of late deliveries. If Company D misses their service level agreements for retail customers, they can receive financial penalties

(Berry, 2014). Beyond these complications, Company D often undersells as opposed to oversells. Finished goods that are not sold will be melted and/or donated. The components for these products often times are very expensive – consequently, not achieving anticipated sales for these items is unfavorable for Company D’s financials.

The recommended shift in strategy would be to manufacture products, which are characterized as *new* with local production vendors. Company D already has multiple contract manufacturing agreements with domestic vendors, many of which solely do business with Company D. The shift from international vendors to local vendors for new stock keeping units will lead to decrease in manufacturing lead-times as well as increased customer service levels. As shown above, the transference from an efficient and cost effective supply chain strategy to a responsive supply chain strategy, for new products with unpredictable demand profiles will further enable Company D to meet the needs of their largest customer segment by sales revenue.

Component Supplier Relationships

Company D uses three different strategies for purchasing practices. One of them is *self supply* which means that contract manufacturers will secure the required manufacturing components without an approved vendor list. The second strategy is Company D directly purchasing product and bringing it in-house to their warehousing facility for kit assembly. The third purchasing strategy is *directed supply* which entails of a list of approved component suppliers that the contract manufacturers can utilize to procure necessary materials. Suppliers that are categorized as *directed supply* have been thoroughly evaluated by Company D as well as

undergone careful pricing negotiations. Company D estimates that approximately eighty percent of their purchasing activities are done through *directed supply*.

During interviews, Company D expressed concerns over the loss of control that is inherent in a *directed supply* mechanism. The primary benefits to *directed supply* are the decreases in complexity for administration that is internal to the firm. However, since Company D does not directly oversee the purchasing process of components to the manufacturers, they do not have direct insight or control over component vendors who may be late in delivering components to manufacturers. Without an accurate collection of metrics to evaluate the performance of these component vendors who deliver critical components to manufacturing vendors of Company D, the delays that occur while manufacturing vendors are collecting components are exceedingly difficult to diagnose. Furthermore, not being able to collect metrics on vendor performance diminishes Company D's ability to hold vendors accountable or to incentivize them to deliver on time.

The nature of the *directed supply* mechanism is tactical and fit for non-critical items. For non-critical items, the use of *directed supply* would be appropriate as it leads to a decentralized purchasing process (SupplyChainOpz, 2013). In accordance to the "Kraljic Purchasing Portfolio Matrix", many of the components that Company D purchases for manufacturing are considered strategic. Strategic items have high profit impact as well as high supply risk (Colwell, 2012).

An alteration of Company D's component supplier relationship that may be considered is to centralize the purchasing function during new product launches and to build upon current strategic relationships with suppliers. For instance, centralizing the purchasing function during new product launches will allow Company D to measure the service expectations in real-time as opposed to relying on the contract manufacturer to relay the data on service expectations. This

would allow for immediate remedy of delayed deliveries instead of contract manufacturers waiting on the late vendors for production.

Furthermore, before trade-shows, Company D can communicate the final bill of materials for the new products to the prospective component suppliers and collect information on current capacity constraints from the component vendors. Company D then could pursue the option of locking in various levels of production or be pro-active and look into sourcing from multiple suppliers (if possible) for a critical component.

Overall, instead of pursuing a purchasing strategy that tries to minimize or possibly eliminate the act of purchasing in the firm, Company D should carefully evaluate the bill of materials for *all* products in their portfolio, focusing primarily on “new” and high volume “foundation” stock keeping units. Once that is completed, Company D should strive to keep total control of the purchasing processes for components of which have a high impact on the total cost of goods sold (Choi & Linton, 2011). Assuming control of purchasing for critical components will not only allow for greater visibility within Company D’s supply chain, but will also allow for rapid shifts in sourcing strategy during supply chain disruptions.

This presents a significant challenge for Company D, however. Since much of the purchasing activities have been outsourced to the contract manufacturers, the abilities of the purchasing function currently at Company D will have to be learned again which would likely cause Company D to incur training costs or hiring new talent in their purchasing department.

Supplier Selection and Evaluation

As was stated in the “Component Supplier Relationships” section, Company D participates in thorough negotiations with prospective suppliers before they can become an approved vendor for directed supply. The same is true for manufacturing vendors. During executive interviews, the two critical aspects of supplier selection were defined as (1) price and (2) technical expertise. These suppliers will undergo occasional audits to ensure that they comply with various government regulations.

However, once these suppliers are approved, there is little to no re-evaluation of the supplier’s performance, nor an analysis of how vendors did in comparison to one another. It is widely believed that many firms only partially or poorly re-evaluate and compare their suppliers (Boudreaux, 2009). Although Company D has recently done modest component supplier rationalization, there are no programs in place for manufacturing excellence or utilization of quality and rejection rates in supplier selection.

Another risk that arises in this current supplier selection methodology and lack of re-evaluation is relying on previous employees due diligence while evaluating and selecting new suppliers (Suddath, n.d.). If certain suppliers are consistently late under the directed supply purchasing method, for instance, Company D wouldn’t necessarily know, as the contract manufacturers who perform the directed supply purchasing are not obligated to report these metrics to Company D. This can aggregate numerous hidden costs in the supply chain network.

One way to integrate proper supplier evaluation and re-evaluation into their supplier selection and evaluation processes would be to maintain direct control over the purchasing processes of critical components in relation to their impact of cost of goods sold for their respective bills of materials. For the suppliers whom Company D directly purchases materials

from, they can utilize metrics such as on-time delivery, return rates, or number of supplier corrective actions (Boudreaux, 2009).

One of the benefits to implementing these key performance indicators is the collection of historical data can help Company D create more leverage during contract negotiations (Berry, 2014). Furthermore, suppliers whom perform can be further developed, awarded more business, and suppliers who underperform can be notified, and depending on contract agreements, receive financial penalties (Boudreaux, 2009).

Functional Silos and S&OP (Sales and Operations Planning)

As is, Company D does not participate in Sales and Operations Planning, or S&OP. During company interviews, employees stated that the functions within the company operate as siloes. This structure manifested whilst collecting data on product flow-paths – there was significant push back from other functions within the supply chain, which proved to be severely limiting for this research.

However, there are cost effective ways to mitigate this. Oliver Wright defines S&OP as “a senior management decision-making process that ensures that the tactical plans in all business functions are aligned and support the business plan”. S&OP does not require financial capital in order to implement – rather, it requires long-term commitment from all functions and significant time to implement. However, the benefits if adopted and done consistently can be impressive.

First, and perhaps most suited to Company D’s needs are the possible improvements in new product launches (Prokopets, 2013). Top performing organization of which use S&OP will bring together sales, marketing, demand planning, supply planning, finance, and procurement

(Prokopets, 2013). Firms often also are able to improve their service levels, reduce the cost of materials, and improve their labor productivity (Prokopets, 2013).

Increasing the information exchange between internal functions at Company D to identify disconnects in their current practices with an S&OP process would allow for a virtuous cycle in process improvement. It is encouraged that Company D considers the implementation of S&OP within their business planning processes.

Chapter 5

Conclusion

Over the course of reviewing prior literature and information surrounding Company D's strategic goals, there were multiple instances where a significant mismatch in supply chain strategy and the characteristics of demand, customers, and distribution channels were evident.

Determining supply chain design based off of what *seems* most cost effective can lead to myopic approaches in network design, as was evident in Company D's approach to manufacturing flow-path optimization (Girchnik, Winkler, & Hochberg, 2006). In other words, firms who are inordinately concerned about the bottom line of manufacturing costs can become incognizant as to how this is affecting the most important part of their strategy – the customers. Girchnik, Winkler and Hochberg call this *Manufacturing Myopia* and the remedies for the phenomenon are as follows (2006):

The cure for manufacturing myopia is 20/20 vision – in other words, the cultivation of awareness of manufacturing costs and means. Companies can sharpen their ability to see their operations more clearly and redesign them more flexibly. Those that achieve this kind of prowess find that the manufacturing function is no longer seen primarily as a cost centre that needs to be cut back or outsourced. Instead, the ability to produce higher-quality goods at lower prices in a more flexible manner is a key component of their long-term competitive strategy and a central, dependable part of their identity. (p.1)

With the above being said, Company D can only achieve true manufacturing flow-path optimization when they are able break down functional silos, collaborate and gain an exhaustive idea of what their supply chain looks like, and structure it appropriately for their customers.

All of the above will require a radical shift in internal business strategy and will likely be a long-term implementation. However, with executive support and cross-functional awareness, Company D does have the resources necessary in order to overhaul their supply chain network design in a cost-effective manner.

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